

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER 82-32	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Health Status of Women in the U.S. Military		5. TYPE OF REPORT & PERIOD COVERED Interim
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Anne Hoiberg		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Naval Health Research Center P.O. Box 85122 San Diego, California 92138-9174		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 62758N MF58.528.01A-0001
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Medical Research and Development Command National Naval Medical Center Bethesda, Maryland 20814		12. REPORT DATE December 1982
		13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Bureau of Medicine and Surgery Department of the Navy Washington, D.C. 20372		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Navy enlisted women Health Status and hospitalization rates Nontraditional jobs Pregnancy policy and abortion Physical and mental well-being		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report focused on the major health-related issues concerning women in the military: pregnancy-related conditions, physical injuries and capabilities, and stress-related disorders. The most frequent reason for being hospitalized among Navy women who enlisted from 1974 to 1979 was for a pregnancy-related condition which accounted for 21.9% of all hospitalizations. Comparisons of injury-related hospitalizations indicated that women recruits had the highest rates across occupational groups and pay grades; women assigned		

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

to nontraditional jobs had somewhat higher admission rates for injuries than women in traditional jobs. Rates for injury- and stress-related conditions tended to decrease with increasing pay grade levels. Programs designed to improve women's physical conditioning, to enhance their job-related capabilities, and to expand their opportunities have been implemented in all branches of the military.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

HEALTH STATUS OF WOMEN IN THE U. S. MILITARY

A. HOIBERG

Superintendent (Code 1424)
Naval Post Graduate School
Monterey, California 93940

REPORT NO. 82-32



NAVAL HEALTH RESEARCH CENTER
P. O. BOX 85122
SAN DIEGO, CALIFORNIA 92138

NAVAL MEDICAL RESEARCH AND DEVELOPMENT COMMAND
BETHESDA, MARYLAND

Health Status of Women in the U.S. Military

Anne Hoiberg

Longitudinal Studies Program
Environmental Medicine Department
Naval Health Research Center
P.O. Box 85122
San Diego, California 92138-9174

Report Number 82-32

supported by Naval Medical Research and Development Command,
Department of the Navy, under Research Work Unit 62758N MF58.528.01A-0001.

The views presented in this paper are those of the author.

No endorsement by the Department of the Navy has been given nor should any be inferred.

Special thanks are extended to Chris Blood for his many contributions to this study.

SUMMARY

Problem

During the past decade, the percentage of women in the military increased from less than 2% to nearly 10%. Numerous policy changes were implemented throughout this time period which were designed to expand military women's roles, such as the opening of all occupational specialties except combat-related jobs, the modification of the pregnancy policy, and the assignment of women to shipboard duty and other previously male-only duty assignments. Maintaining the health and safety of women requires the identification of their health care needs as well as programs and directives developed to enhance their utilization.

Objectives

The purpose of this study is to provide answers for the following questions: (1) What impact has the 1975 pregnancy policy had on women's utilization, hospitalization rates, days lost from duty, and attrition? (2) With increases in women's enlistments and the assignment of women to integrated recruit training, nontraditional occupational specialties and shipboard duty, what, if any, physical and mental health effects have been evidenced? (3) What policies and directives have been implemented to ensure the continuation of equal opportunity and increased utilization of women in the military?

Results

The most frequent reason for being hospitalized among Navy women who enlisted from 1974 to 1979 was for a pregnancy-related condition (1,679 deliveries and 1,621 abortions) which accounted for 21.9% of all hospitalizations. With regard to days lost from duty for inpatient medical care, the highest number of hospitalized days was for mental disorders, followed by pregnancy-related conditions. The percentage of women who were separated for pregnancy or parenthood was 11.1% of the total enlisted population of women.

Comparisons of injury-related hospitalizations indicated that women recruits had the highest rates of all occupational groups and pay grades; women assigned to nontraditional jobs had somewhat higher admission rates for injuries than women in traditional jobs. The lowest stress-related hospitalization rates were observed for women in traditional jobs; the values for women in nontraditional occupations were only slightly higher. Rates for injury- and stress-related conditions tended to decrease with increasing pay grade levels.

One of the most recent and important endeavors to promote women's role in the armed forces was the development of physical standards for each occupational specialty. An outgrowth of such research in each military branch was the establishment of physical strength capabilities of men and women as well as physical conditioning programs. With regard to other areas designed to foster greater acceptance of women in the military, all branches have adopted strict policies and programs concerning the promotion of equal opportunity and prevention of sex discrimination and sexual harassment.

Conclusions

The focus of this study centered on the major health-related issues pertinent to women in the military: pregnancy-related conditions, physical injuries and capabilities, and stress-related disorders. Results revealed that women's relatively high rates for injuries and stress-related disorders tended to decrease across pay grade levels thereby suggesting that women's health status improved with time and experience on the job. Throughout the past decade, numerous policies and programs have been implemented to ensure equal opportunity for all military personnel. Active duty personnel also have a responsibility and that is to commit themselves to pursuing the opportunities available to them in the military which will enable them to enhance their physical, mental, and professional well-being.

In 1972, the U.S. Department of Defense initiated plans to increase the numbers and expand the role of women in the military. During the ensuing decade, the percentage of women rose from 2% to nearly 10%, with a projection to 11% or 210,000 women anticipated by 1987. In addition to this gradual shift in the military's composition, all occupational specialties were opened to women in 1974 with the exception of combat-related jobs.

Another change that affected the utilization of women was the modification of the pregnancy policy which, beginning in 1975, enabled military women to remain on active duty during and after a pregnancy. Recently, the Navy's pregnancy policy added a stipulation specifying that a request for separation may not be granted if the woman is assigned to a critical job or training program. Also in 1975, the Stratton Bill was enacted which allowed women to enter the service academies for the first time, and in 1978 Congress modified Section 6015, 10 USG, which permitted the Navy to assign women to noncombatant ships. A restriction in this amendment was that women could not serve on combatant vessels although temporary duty of up to six months was allowed, provided a combat mission was not anticipated during that time period. By 1981, 1,600 women had been assigned to 24 ships with a projection of 5,000 women serving on 30 ships by 1985.

The most recent Congressional enactment affecting military women was passage of the Defense Officer Personnel Management Act (DOPMA), an amendment primarily designed to revise and make uniform the provisions of the law relating to the appointment, promotion, separation, and retirement of regular commissioned officers of the military and to equalize treatment of male and female officers. In 1981, the Supreme Court of the United States debated the issue of whether or not both men and women should register for possible military conscription; the decision of the justices was that women would not be required to register.

From this brief historical perspective, we can surmise that this past decade has been a period of significant changes, which has affected women's opportunities and utilization in the military. Also during this period, health care specialists, personnel managers, and policymakers endeavored to meet the overall needs of the increasing numbers of women as well as the specific requirements of those women assigned to nontraditional occupational specialties and such demanding duty assignments as shipboard duty. The question posed in this report is: What are the health care needs of women in the military that have evolved as a result of these changes? To be specific, the purpose of this study is to provide answers for the following questions: (1) What impact has the 1975 pregnancy policy had on women's utilization, hospitalization rates, days lost from duty, and attrition? (2) With increases in women's enlistments and the assignment of women to integrated recruit training, nontraditional occupational specialties, and shipboard duty, what, if any, physical and mental health effects have been observed? (3) What policies and directives have been implemented to ensure the continuation of equal opportunity and increased utilization of women in the military?

Pregnancy-related Conditions in the U.S. Military

Of all women-related issues debated and researched in the military, the most controversial is the impact of pregnancy and childbirth on morale, discipline, lost time, attrition, and duty assignments. According to Lawrence Korb, Assistant Secretary of Defense for Manpower, Reserve Affairs and Logistics, the only sex-specific issue affecting military readiness is that of pregnancy; all other issues associated with combat readiness relate to both men and women (Purcell, 1982). A Navy physician (Buchta, 1981) also states that the "largest problem facing the Women at Sea Program [also known as Women in Ships] is the issue of pregnancy." In a study conducted for the U.S. Air Force, Bircher (Note 1) concludes his report by recommending that because of women's elevated rates of lost time for medical causes, especially pregnancy and childbirth, the Air Force should restrict the assignment of all women in hazardous occupations and in those jobs

essential to military readiness. Segal (Note 15), on the other hand, reminds us that "the average American woman is pregnant for a very small proportion of her life and some women never do become pregnant," which suggests that pregnancy "is no reason to exclude all women from a particular job...." Officials at the Pentagon have estimated that 8% of military women are pregnant at any given time (Adams, 1980).

The pregnancy policy stipulates that a pregnant woman must decide, no later than four months before the delivery date, whether or not to request a separation from active duty. If she remains, which may be involuntary if military readiness could be adversely affected by her separation, her doctor will prescribe the prenatal and postnatal period and recommend changes in her duties as deemed necessary. For a pregnant woman assigned to sea duty, the situation becomes more complicated in that a 1980 Navy policy requires her immediate reassignment to a shore facility where comprehensive medical care is readily available. The resulting abrupt transfer of a crew member to a shore facility creates a shortage of enlistees on the ship and personnel disruptions for the shore command. One ship has reported that 15% of the women assigned to sea duty were transferred because of pregnancy although it is unknown if these transfers occurred at the same time or over an extended period of time (Buchta, 1981). In some instances, pregnant women have been unable to perform their assigned duties, which has led to hardship and morale problems among coworkers (Adams, 1980).

Studies conducted at the Naval Health Research Center (Hoiberg, 1979; Hoiberg, 1980; Hoiberg & Thomas, 1982; Hoiberg, in press) have reported hospitalization rates for Navy enlisted women as double those of their male counterparts. Prior to passage of the pregnancy policy, the most prevalent reasons for women's hospitalizations were for pregnancy-related conditions (approximately one-third of all admissions) of which an elective abortion was the most frequent (Hoiberg, 1979; Hoiberg, 1980). In 1978, however, federal funds for abortions were discontinued, which resulted in the cessation of performing this procedure at military medical facilities. Because of this policy change, hospitalization rates for pregnancy-related conditions would be expected to decline. Other results of those studies identified childbirth as the second leading reason for women's hospitalizations. Although pregnant women could not remain on active duty prior to 1975, they were permitted to give birth in naval medical facilities after their separation from service which accounted for the relatively high childbirth hospitalization rates that were reported.

For Navy women who enlisted since 1974, the rates of pregnancy-related hospitalizations from 1974 through 1979 are presented in Table 1 for each of four occupational clusters by pay grade level. The job categories included: (1) Nonrated for women in E-1 through E-3 pay grade levels who had not been assigned to an occupational specialty; (2) Nontraditional for specialties associated in the past primarily with men, such as Electrician's Mate, Machinery Repairman, Aviation Mechanic, etc.; (3) Hospital Corpsman for women assigned to the health care field; and (4) Traditional for all clerical, administrative, and service specialties. The Hospital Corpsman specialty was not collapsed into the Traditional classification because of the fairly large number of women assigned to this occupation and because of the elevated hospitalization rates typically reported for this group. All Navy recruits, or those at the E-1 (initial) pay grade level, were included in the Nonrated category. The other occupational groups were divided into pay grade levels from E-2 to E-5 through E-9; pay grades 5 to 9 were combined because of the low numbers of women at these higher levels.

The highest hospitalization rates for each of the four occupational groups were observed for pregnancy-related conditions, as can be seen in Table 1. These hospitalizations represented less than one-quarter (21.9%) of all admissions occurring from 1974 through 1979. Across all groups, the highest rates were noted for childbirth with a total of 1,679 deliveries recorded, followed by hospitalizations for abortions of which there were 1,621 performed since 1974. At lower pay grades within each category, the rates were higher for abortions than deliveries whereas the reverse was the case at high pay levels. This reversal in rates probably reflects the impact of both the pregnancy policy and the discontinuation of performing abortions in federal medical facilities. With enactment of the pregnancy policy, moreover,

many women, particularly those at the higher pay grade levels, apparently have decided to combine the role of motherhood with that of being a sailor (Hoiberg & Ernst, 1980).

TABLE 1
HOSPITALIZATION RATES FOR NAVY ENLISTED WOMEN
BY OCCUPATIONAL GROUP, PAY GRADE, AND DIAGNOSIS, 1974-1979

DIAGNOSTIC CATEGORY (ICDA-8 rubrics)	RATE BY OCCUPATION AND PAY GRADE ^a														
	NONRATED			NONTRADITIONAL			HOSPITAL CORPSEMAN				TRADITIONAL				
	E-1 ^b	E-2	E-3	E-2	E-3	E-4	E-5-9	E-2	E-3	E-4	E-2	E-3	E-4	E-5-9	
Pregnancy-related Conditions	462.5	1553.2	1114.2	271.0	292.3	311.8	72.6	716.3	598.2	448.8	197.9	265.2	262.6	278.5	193.2
Abortion	215.7	772.7	411.4	119.0	96.2	97.2	0	316.7	247.2	123.6	36.6	147.0	110.7	92.3	39.5
Delivery	171.4	541.9	556.0	112.4	140.6	182.2	72.6	226.2	124.6	203.8	88.0	86.5	118.0	148.8	135.4
Mental Disorders	639.6	798.6	431.4	145.4	107.3	56.7	0	407.2	234.7	112.7	29.3	107.6	74.1	73.2	56.4
Neuroses	172.4	108.9	66.7	6.6	11.1	4.0	0	67.9	45.7	36.8	0	8.6	9.4	13.1	19.7
Alcoholism	98.0	184.1	95.6	19.8	18.5	16.2	0	79.2	37.4	21.7	7.3	22.1	16.7	14.6	5.6
Transient situational disturbances	102.8	132.2	86.7	59.5	18.5	12.2	0	75.4	60.2	23.8	22.0	21.1	14.1	14.6	8.5
Diseases of the Respiratory System	789.4	306.0	184.6	39.7	48.1	52.6	29.0	422.2	297.0	195.1	51.3	42.3	37.1	24.7	16.9
Acute upper respiratory infection	268.5	10.4	13.3	0	3.7	0	0	37.7	14.5	15.2	0	1.0	0	0	1.4
Pneumonias	280.7	18.2	31.1	0	3.7	0	0	60.3	37.4	10.8	0	1.0	.5	2.5	1.4
Diseases of the Genitourinary System	429.6	505.6	320.2	33.0	51.8	48.6	14.5	456.2	332.4	195.1	124.6	76.9	67.8	79.2	57.8
Disorders of menstruation	106.4	142.6	106.8	0	0	4.0	0	116.9	76.8	47.7	14.7	25.0	15.7	13.1	8.5
Accidents, Poisonings, and Violence	555.8	510.8	218.0	79.3	62.9	97.2	72.6	418.5	228.5	104.0	29.3	69.2	57.9	54.5	24.0
Strains, sprains, and dislocations	129.0	77.8	51.2	13.2	18.5	8.1	14.5	105.6	49.8	17.3	7.3	14.4	12.5	13.1	2.8
Wounds, injuries, and contusions	182.7	132.2	60.0	19.8	18.5	36.4	43.5	143.3	91.4	34.7	7.3	26.9	16.7	19.7	5.6
Adverse effects - drugs/medications	98.0	116.7	20.0	6.6	3.7	16.2	0	33.9	41.5	23.8	0	12.5	10.4	3.5	2.8
Infective and Parasitic Diseases	475.7	316.3	175.7	72.7	40.7	20.2	0	558.0	303.3	151.8	29.3	57.7	31.8	25.7	16.9
Diarrheal disease	129.0	57.0	24.5	26.4	7.4	16.2	0	154.6	74.8	45.5	0	8.6	9.4	5.6	4.2
Supplementary Classifications	748.8	176.3	137.9	13.2	29.6	36.4	0	124.4	91.4	69.4	36.6	27.9	44.4	41.4	39.5
Symptoms and Ill-defined Conditions	410.7	303.4	153.4	39.7	70.3	20.2	43.5	376.9	193.2	99.7	7.3	43.2	34.4	26.7	19.7
Symptoms referable to gastrointestinal tract	195.0	137.4	75.6	19.8	48.1	4.0	14.5	166.2	89.3	52.0	0	21.1	12.0	13.1	4.2
Diseases of the Digestive System	248.7	344.9	238.0	19.8	48.1	48.6	43.5	346.8	211.8	134.4	36.6	53.8	54.3	36.3	39.5
Diseases of the Musculoskeletal System and Connective Tissue	287.3	171.1	135.7	39.7	55.5	64.8	43.5	211.1	172.4	121.4	29.3	39.4	45.9	34.3	24.0
Diseases of the Skin and Subcutaneous Tissue	296.7	121.9	102.3	19.8	18.5	8.1	0	82.9	72.7	39.0	14.7	18.2	19.3	16.1	11.3
Cellulitis	212.9	18.2	22.2	0	3.7	0	0	30.1	18.7	4.3	7.3	3.8	2.1	1.0	0
Neoplasms	96.1	137.4	129.0	19.8	40.7	16.2	0	109.3	99.7	39.0	7.3	18.2	24.0	19.7	28.2
All Other Hospitalizations	213.8	306.0	151.2	19.8	25.9	12.1	29.0	282.7	193.2	151.7	51.3	45.2	29.2	38.9	32.4
Total Hospitalization Rate	5653.6	5551.7	3492.0	813.0	891.9	793.3	348.2	4511.9	3028.7	1862.0	645.0	864.9	783.5	749.4	559.6
Population at Risk	42465	7713	4496	3026	2702	1853	517	5306	4814	3460	1023	20811	19144	14861	5321

^aHospitalization rates are numbers of admissions per 10,000 strength per year.

^bIncludes all enlisted women at the E-1, or initial, pay grade level; pay grades 5 to 9 have been combined because of the low numbers.

With regard to days lost from duty for inpatient medical care, mental disorders accounted for the highest number of days hospitalized for Navy women both during the 1973 to 1975 time period and also since passage of the pregnancy policy (Hoiberg, 1979; Hoiberg & Thomas, 1982). The number of days hospitalized for pregnancy-related conditions resulted in the second highest total days hospitalized for both time frames. Among all military women, there were 1,112 deliveries in 1975 which represented 14,168 days hospitalized (Bircher, Note 1).

In comparing reasons for separations from active duty, the percentage of pregnancy/parenthood discharges was the highest for Navy enlisted women's separations during the 1973 to 1975 time period. For the years of the current investigation (1974 through 1979), the percentage of pregnancy/parenthood separations accounted for 11.1% of the total population of enlisted women. The lowest percentage of pregnancy/parenthood discharges was observed for women in nontraditional jobs.

Physical and Mental Health Risks among Military Women

Physical Health Considerations. The second phase of this study was designed to identify the physical health effects associated with women's assignment to integrated recruit training, nontraditional occupational specialties, and shipboard duty. Prior to 1978, Army enlisted women were assigned to their own basic training which was evaluated on pre- and posttraining tests as being ineffective in producing significant improvements in women's aerobic fitness, psychological states, physical self-assessment, or attitudes (Kowal, Patton, & Vogel, 1978). Since then, the Army has adopted integrated basic training, a change that provided women with a greater challenge and increased opportunities to excel. While results of a pilot study indicated that the beneficial effects of integrated training included improvements in women's physical fitness and psychological assessments, other findings (Kowal, 1980) showed that women suffered significantly more physical injuries than men during basic training (62% or 215 of 347 women reported some type of injury as contrasted with 26% or 202 of 770 men). These injuries included: tibial stress fracture, chondromalacia of the patella, hip or neck of femur stress fractures, sprains, Achilles tendinitis, calcaneous or metatarsal stress fracture, and fascial and anterior compartment strains.

The author of that study identified the following factors as predictors of basic training injury: body composition (percent body fat, muscular strength of the legs, extent of previous athletic participation, self-perception of fitness, and psychosomatic predisposition. The variable with the greatest value for the prevention of a basic training injury was that of prior fitness and conditioning. Concluding from Kowal's findings, overall injury rates would decline if recruiting efforts were concentrated on enlisting those men and women in relatively good physical condition, as reflected in part by their self-reported participation in a preenlistment physical fitness regimen.

On the basis of the specified risk factors, Kowal suggested that male and female applicants identified as probable injury candidates should be assigned to a remedial physical conditioning program prior to the more strenuous regimen in basic training. This recommendation would be expected not only to lessen the impact of poor conditioning on injury rates but also to improve muscular strength, self-perception of fitness, and body composition--factors all of which would reduce physical injury rates. Research findings supportive of the benefits accrued from a remedial physical conditioning program have been reported in two studies conducted for the Marine Corps (Hoiberg, 1978; Berard & Hoiberg, 1980). Results showed that the strongest correlates of both recruit training success and 2-year effectiveness were favorable attitudes toward the Marine Corps and prior service participation in physical activities. Of greatest importance was the finding that prior conditioning was a powerful predictor of success in the Marine Corps for samples of men identified as physically marginal at the time of enlistment.

An examination of Navy data compiled on injury rates during recruit training revealed comparable, elevated hospitalization rates among male and female recruits for cellulitis (blisters on the feet), one of the five most prevalent diagnoses requiring inpatient medical care (Hoiberg, 1980). During 1974 to 1979, the rate of cellulitis, as shown in Table 1,

also ranked among the leading reasons for women recruits' hospitalizations. Also shown in Table 1 are the accidental injury hospitalization rates across the four occupational groups. Comparisons of these rates indicated that women in nontraditional jobs had somewhat higher injury rates across pay grade levels than women in traditional jobs, particularly for pay grades E-5 through E-9. The highest overall injury rates, however, were observed for women in the nonrated and Hospital Corpsman groups. Across the four groups, the rates tended to decrease with increasing pay grade levels, suggesting that women's admission rates diminished with time and experience on the job.

In another study, Kane (Note 7) reported that Navy enlisted women during the initial phases of integration on tugboats were not adequately trained to perform most of the physically demanding tasks nor had they received seamanship training prior to their assignments. Women now participate in the same recruit training and seamanship training programs as men, which should lessen in part the differences in men's and women's performance discussed by Kane. More recently, Thomas (Note 16) observed that only 36% of a sample of 117 women assigned to two ships responded that they were having difficulties performing tasks requiring physical strength; 20% of 900 men also stated that they experienced similar difficulties. Issues associated with shipboard life that posed a greater problem for these women were crowded quarters and the loss of an allowance paid to those living ashore.

Other factors related to women's physical injuries and possible performance decrements have been ill-fitting garments, tools, and equipment. Kowal (1980), for example, noted that the boot worn by female Army recruits contributed to ankle weakness and heel instability which in turn contributed to their higher rate than men of physical injuries. In designing women's clothes and equipment for military service, the view held has been that women's sizes were a scaled-down version of men's with the 50th and 95th percentiles of women's anthropometric measurements corresponding to the 5th and 50th percentiles for men (Phillips, Bogardt, & Pepper, Note 13). This limitation fails not only to take into account all other women but also does not consider women's vastly different anthropometric and biomechanical measurements from men's in the designing of clothes, equipment, and work spaces. In order to remedy this shortcoming, the Navy recently completed an extensive undertaking to establish current anthropometric measurements for men and women; the last such study was conducted in 1964.

An important point to make at this juncture is that changes made to military clothing or equipment typically require a total of 7 years from date of request to date of delivery of the finished product. For example, requests to design and construct rough-weather gear and safety apparel for women assigned to ships could not be issued until the congressional amendment for such assignments had been approved in 1978, which has resulted in the continuing unavailability of these items for women on sea duty. As a consequence, many women have had to wear clothing designed for small men and to use tools and equipment developed for a man's larger grip size and longer arm reach. This "having to make do" probably has contributed to a proportion of women's injury rates as well as a decrement in their performance effectiveness.

Mental Health and Psychosomatic Considerations. Although no research has been published on the specific health risks attributable to sex discrimination, sexual harassment, or prejudice against a minority group (i.e., women in the military), this association warrants research consideration in order to quantify the extent of the relationship between ill health and such social stresses. What has been reported is that incidents of such behavior adversely affect productivity and morale which in turn can lead to an increased absenteeism rate because of ill health among victims (Chapman & Chapman, 1982). With regard to the health risks among minorities (any group with less than 20% representation), Kanter (1972; 1977) developed a conceptual framework to describe the interactions occurring in groups with a varied composition, such as a "skewed" group or one with a ratio of no more than 85:15 and one that most closely resembles the sex-mixed work groups in the military. According to Kanter, members of minority groups are not treated as individuals but rather as symbols or tokens and they feel considerable pressure to perform successfully. Dominants, because of their deep-rooted attitudes and stereotypes, tend to engage in a number of "denial mechanisms" to minimize the tokens' performance

(Safilios-Rothschild, 1978). The consequences for women of feeling extra pressure to perform successfully in a skewed work group, whose members may be reluctant to acknowledge their accomplishments, might be evidenced by an increased incidence of stress-related illness.

Research on the increased utilization of women in the military identified a prevalence among men of negative attitudes toward women on active duty and at the service academies. Such attitudes were held primarily by those men who valued traditional roles for women or who purported a machismo orientation (DeFleur, Note 4; Durning, 1978; Adams, 1980). An outgrowth of those beliefs would be a lessened acceptance of women as full-fledged coworkers and a potential negative influence on women's physical and mental well-being. As an example of this probable impact on women's mental well-being, Kundson and Alva (Note 8) reported that 63% of their total sample of Army enlisted women (31 women from traditional and 36 from nontraditional units) responded at moderate to severe distress levels on a measure of general mental well-being, as contrasted with 34.7% in a national sample.

Another concern voiced by many men centered on the effects of women's presence on the camaraderie and male bonding postulated as crucial to military effectiveness (Tuten, Note 17). Although this issue has been expounded on by both researchers and policymakers, no research projects have concluded that women do indeed detract from the phenomenon of male bonding. Most military women, however, are cognizant of men's concern about their impact on the performance of previously all-male work groups. As a counterpart to this potentially adverse influence, Bourne (1970) suggested that more critical than male bonding among such highly trained groups as the Green Berets was the importance of respect for each member's unique contribution to the mission which tended to foster feelings of independence and aloofness among group members. Other research examined the development of female bonding. For example, a preliminary report on women participating in a recent NASA program stated that "the women had quickly bonded together into a group that was more cohesive and much more supportive than anyone at NASA had anticipated" (Rowes, 1982).

Compounding the difficulties associated with skewed work groups and men's resistance to accepting women in the military was the fact that, characteristically, military women differed significantly from their male counterparts. Women enlistees on the average scored better than men on aptitude measures and were more likely to have a high school diploma (Binkin & Bach, 1977; Hoiberg & Thomas, 1982). With an awareness of these differences, many women may have "looked down" on their male coworkers which seemed to be reflected by the finding that an overwhelming majority of Army enlisted women (82%) agreed that "in some ways, women in the Army are sharper and better soldiers than a lot of men" (Hicks, 1978).

Other selection criterion considerations also distinguished women from men. Because there have been many more women applicants than can be accepted, in contrast to a smaller ratio of male applicants to the total male population, it also was likely that recruiters enlisted only those women who had a high probability of being able to withstand the hardships and separations of military life and, therefore, were less likely than men to be prematurely separated from service. In comparisons of reasons for premature discharges, this hypothesis has been substantiated for Navy enlisted men and women who entered service in 1975. That is, Hoiberg and Thomas (1982) reported that throughout the 4-year enlistment men had a significantly higher proportion of separations for unsuitability and disciplinary problems than women (22.3% versus 14.7%). As noted earlier, a major reason for women's premature separations was for pregnancy or parenthood.

Under these multifaceted conditions, the effects for military women of feeling considerable pressure to prove themselves and of resolving the role conflict to perform like a man (i.e., a soldier or sailor) while conforming to the standards of femininity held by men (Coye, Note 3; Thomas, Note 16) might be reflected in an elevated rate for stress-related illness. Several disorders (transient situational disturbance, other mental disorders, diarrheal disease, and abdominal and gastrointestinal disorders) have been identified as related to psychosocial stress resulting from significant changes or pressures in an individual's life situation (Wolf, 1971; Caplan, Cobb, French, Van Harrison, & Pinneau, 1975).

In an effort to explore this association, comparisons of hospitalizations between men and women were conducted for each of these disorders.

Results have determined that enlisted women during the 1973 to 1975 time period in nontraditional, Hospital Corpsman, and other traditional occupational groups had elevated hospitalization rates for abdominal symptoms and diarrheal disease (Hoiberg, 1980). By way of contrast, hospitalization rates for these disorders among enlisted men were significantly lower--as much as 18 times lower for those at the pay grade level of E-2. At most pay grade levels, furthermore, a rank ordering of women's rates for the top five diagnoses included symptoms referable to the abdominal system and diarrheal disease as well as transient situational disturbance and other mental disorders. As presented in Table 1, results of comparisons for 1974 to 1979 data indicated that women's rates for these disorders also tended to be among the highest for each of the four occupational groups. Similar to the decline noted for accidental injuries, rates for almost all stress-related disorders decreased across pay grades for each of the four groups. The lowest stress-related hospitalization rates were observed for women assigned to traditional occupations while the values for women in nontraditional occupations were only slightly higher, a result that seemed to contradict research design expectations. Overall, these findings suggested that as increasingly more women remain in the military and gain job experience their hospitalization rates for the cited stress-related disorders would be expected to decline. Another interpretation proffered was that the relatively low admission rates for the nontraditional group might be a reflection of the effects on women's health of being members of a gradually increasing minority group.

Future Directions toward Enhanced Utilization of Military Women

Results of the studies cited thus far have shown that considerable progress has been made in integrating women into all facets of the military, except combat-related jobs. The final part of this report examines other policies and directives that have been implemented to ensure the continuation of equal opportunity and the enhancement of women's physical and mental well-being.

A major endeavor currently underway, which was designed to further promote women's role in the armed forces, concerned the development of physical standards for each occupational specialty (Hoiberg, Note 6). During the mid to late 1970s, researchers for each branch of the military were tasked with determining the physical strength requirements of every job and of developing a measure to assess the muscular strength of personnel in meeting these selection criteria (Christal, Note 2; Weisz, Note 18; Harrison, Note 5; Robertson, Note 14). The most important objective of such research efforts was to use the strength test batteries in the job classification process to improve the person-job fit for both men and women.

One outgrowth of such research projects was the establishment of the average strength differences between men and women: Women's overall strength has been reported at approximately two-thirds of men's with values ranging from 35% to 86% (Phillips et al., Note 13). Women's mean strength values in the lower and upper extremities were, respectively, 71.9% and 59.5% of men's strength. Other specific measures showed that women's average scores on a handgrip and two-arm lift measures were about 60% of men's.

Building on this research has been the development of physical conditioning programs designed to improve the physical fitness of both men and women. Another research project at the Naval Health Research Center recently was completed that evaluated the effectiveness of a 10-week training program in increasing total body fitness (Marcinik & Hodgdon, Note 9). This program (Scientific Program of Aerobic and Resistance Training Exercise in the Navy or SPARTEN) was developed in response to a Department of Defense directive requiring each branch of the military to design a training program that would prepare men and women for the physical requirements of their occupational specialties or duty assignment. Preliminary results indicated that significant increases have been achieved in women's upper and lower torso dynamic strength, aerobic fitness, and endurance. In evaluating another physical fitness program, Robertson (Note 14) reported that an improvement in women's strength capabilities was obtained on a strength test battery during the pre- and post-

training period of recruit training.

Other research reported on the efficacy of training programs designed to increase the mean strength values of men and women revealed substantial improvements in strength on three measures for both male and female U.S. Air Force pilots, all of whom were in excellent physical condition prior to participation in a thrice weekly, 9-week exercise program (McDaniel, Note 10). An important finding of McDaniel's study was that at the end of the program women's mean strength values nearly approached the initial values of those for men on two of the six measures. In another study, Murphy and Nemmers (Note 11) evaluated a 3-week physical conditioning program that incorporated cardiovascular, strength, and endurance exercises. The performance of the 13 Army enlisted women who participated in this program was rated as highly successful in meeting the specified rates of fire on two different howitzers (Paragallo, Dousa, & Lince, Note 12). No incidents of injuries were reported during these artillery training tests.

Results of the cited research on physical fitness programs clearly pointed up the feasibility of raising women's physical capabilities through participation in well-designed physical training and conditioning programs. Although a difference between men's and women's mean strength values probably will always exist, these results suggested that through such programs the male-female strength differential can be substantially narrowed.

With regard to other areas designed to foster greater acceptance of women in the military, all services have adopted strict policies and programs concerning the promotion of equal opportunity and the prevention of sex discrimination and sexual harassment. As an example of one such program, all member agencies of the Navy are required to provide training on preventing sexual harassment for all supervisors and managers. The official policy is that sexual harassment will not be tolerated in any work setting, and the program developed by the Navy for supervisors and employees alike emphasizes this point very strongly.

In conclusion, the focus of this report centered on the major health-related issues concerning women in the military: pregnancy-related conditions, physical injuries and capabilities, and stress-related disorders. Results of an examination of hospitalization rates revealed that women's relatively high rates for injuries and stress-related disorders tended to decrease across pay grade levels thereby suggesting that women's health status improved with time and experience on the job. As noted at the outset, the military began to expand women's role in the armed forces a decade ago which coincided with the advent of the all-volunteer force and passage of the Equal Rights Amendment. At that time, the goal was to serve as a model for society in promoting equal opportunity for all military personnel. Throughout the decade, numerous policies have been implemented and programs developed to ensure the fulfillment of this goal. From the research cited in this study, it has been determined that considerable progress has been made by the military in meeting this commitment. Our servicemen and servicewomen also have a responsibility and that is to commit themselves to pursuing the opportunities available to them in the military which will enable them to enhance their physical, mental, and professional well-being.

REFERENCE NOTES

1. Bircher, J. Factors in medical noneffectiveness rates (Report No. 114). Washington, D.C.: U.S. Air Force Office of the Surgeon General, Biometrics Division, November 1976.
2. Christal, R. E. Studies relating to the utilization of women completed or planned by the Occupation and Manpower Division, AFHRL. Paper presented at the Tenth Training and Personnel Technology Conference, Washington, D.C., February 1978.
3. Coye, B. F. The role of women in the Navy in the 1980s and 1990s. Paper presented at the Fourth Annual Seminar at the Center for Oceans Law and Policy, University of Virginia, January 1980.
4. DeFleur, L. B. Four years of sex-integration: Changing attitudes, beliefs, and interactions at the U.S. Air Force Academy. Paper presented at the meeting of the Inter-University Seminar on Armed Forces and Society, Chicago, October 1980.
5. Harrison, O. Personal communication, September 11, 1980.
6. Hoiberg, A. Military occupations: The cutting edge for women? Paper presented at the Annual Convention of the American Psychological Association, Montreal, September 1980.
7. Kane, J. E. Women in non-traditional assignments: A case study of Navy tugs. Paper presented at the meeting of the Western Psychological Association, San Francisco, April 1977.
8. Knudson, K. H. M., & Alva, I. Relation of achievement conflicts to the general well being and job satisfaction of Army women. Paper presented at the meeting of the Inter-University Seminar on Armed Forces and Society, Chicago, October 1980.
9. Marcinik, E. J., & Hodgdon, J. A. An assessment of aerobic and circuit weight exercises for enhancement of strength capacity in Navy women. Paper presented at the Fourth RSG4 Physical Fitness Meeting with Special Reference to Military Forces, Boston, 1982.
10. McDaniel, J. W. Male and female strength capabilities for operating aircraft controls (AFAMRL-TR-81-39). Wright-Patterson Air Force Base, Ohio: U.S. Air Force Aerospace Medical Research Laboratory, 1981.
11. Murphy, M. A., & Nemmers, T. M. Ammunition loading and firing test-pretest physical conditioning of female soldier participants (Technical Note 11-78). Aberdeen Proving Ground, Maryland: U.S. Army Human Engineering Laboratory, October 1978.
12. Paragallo, F. R., Jr., Dousa, W. J., Jr., & Lince, D. L. U.S. Army Human Engineering Laboratory female artillery study (Technical memorandum 18-79). Aberdeen Proving Ground, Maryland: U.S. Army Human Engineering Laboratory, October 1979.
13. Phillips, M. D., Bogardt, A., & Pepper, R. L. Female and male size, strength, and performance: A review of current literature (Contractor Report 107). San Diego, California: Naval Ocean Systems Center, October 1981.
14. Robertson, D. Procedures for setting job strength standards. Paper presented at the meeting of the Defense Advisory Committee on Women in the Services, Washington, D.C., April 1981.
15. Segal, M. W. Women in Combat: Contributions to the war of words. Paper presented at the meeting of the Inter-University Seminar on Armed Forces and Society, Chicago, October 1980.
16. Thomas, P. J. Integration at sea. Paper presented at the Annual Convention of the American Psychological Association, Montreal, September 1980.
17. Tuten, J. M. Should the United States halt or reverse the trend toward employment of women in combat? Paper presented at the meeting of the Inter-University Seminar on Armed Forces and Society, Chicago, October 1980.
18. Weisz, J. D. HEL female soldier R&D in materiel design past, present, future. Paper presented at the Tenth Training and Personnel Technology Conference, Washington, D.C., February 1978.

REFERENCES

- Adams, V. Jane Crow in the Army: Obstacles to sexual integration. Psychology Today, 1980, 14, 50-65.
- Berard, S., & Hoiberg, A. The physical conditioning platoon: Two years later. Journal of Clinical Psychology, 1980, 36, 900-905.
- Binkin, M., & Bach, S. J. Women and the military. Washington, D.C.: The Brookings Institution, 1977.
- Bourne, P. G. Men, stress, and Vietnam. Boston: Little, Brown and Co., 1970.
- Buchta, K. Women at sea: A female physician's viewpoint. U.S. Navy Medicine, 1981, 72, 8-12.
- Caplan, R. D., Cobb, S., French, J. R. P., Jr., Harrison, R. V., & Pinneau, S. R., Jr. Job demands and work health: Main effects and occupational differences. Washington, D.C.: U.S. Department of Health, Education, and Welfare, Public Health Service, Center for Disease Control, National Institute for Occupational Safety and Health, 1975.
- Chapman, J. R., & Chapman, G. R. Poverty viewed as a woman's problem--the U.S. case. In A. Hoiberg (Ed.), Women and the world of work. New York: Plenum Publishing Corp., 1982.
- Durning, K. P. Women at the Naval Academy. Armed Forces and Society, 1978, 4, 569-588.
- Hicks, J. M. Women in the Army. Armed Forces and Society, 1978, 4, 647-657.
- Hoiberg, A. Effects of participation in the physical conditioning platoon. Journal of Clinical Psychology, 1978, 34, 410-416.
- Hoiberg, A. Health care needs of women in the Navy. Military Medicine, 1979, 144, 103-109.
- Hoiberg, A. Sex and occupational differences in hospitalization rates among Navy enlisted personnel. Journal of Occupational Medicine, 1980, 22, 685-690.
- Hoiberg, A. Women in the Navy: Performance, health, and motherhood. In J. Brown, M. J. Collins, and F. D. Margiotta (Eds.), Military Manpower Realities in the 1980s. Boulder, Colorado: Westview Press, 1982, in press.
- Hoiberg, A., & Ernst, J. Motherhood in the military: Conflicting roles for Navy women. International Journal of Sociology of the Family, 1980, 10, 265-280.
- Hoiberg, A., & Thomas, P. The economics of sex integration: An update of Binkin and Bach. Defense Management Journal, 1982, 18, 18-25.
- Kanter, R. M. Some effects of proportions on group life: Skewed sex ratios and responses to token women. American Journal of Sociology, 1972, 82, 965-990.
- Kanter, R. Men and women of the corporation. New York: Basic Books, Inc., 1977.
- Kowal, D. M., Patton, J. F., & Vogel, J. A. Psychological states and aerobic fitness of male and female recruits before and after basic training. Aviation, Space, and Environmental Medicine, 1978, 49, 603-606.
- Purcell, R. Korb reassures women officers about their role in the military. Navy Times, March 1, 1982, p. 2.
- Rowes, B. Housewives in space. Omni, 1980, 4, 64-67.
- Safilios-Rothschild, C. Young women and men aboard the U.S. Coast Guard barque "Eagle": An observation and interview study. Youth and Society, 1978, 10, 191-204.
- Wolf, S. Psychosocial influences in gastrointestinal function. In L. Levi (Ed.), Society, stress, and disease (Vol. 1). The Psychosocial Environment and Psychosomatic Diseases. London: Oxford University Press, 1971.

U206439

DEPARTMENT OF THE NAVY

COMMANDING OFFICER

NAVAL HEALTH RESEARCH CENTER

P.O. BOX 85122

SAN DIEGO, CA 92138

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE, \$300

POSTAGE AND FEES PAID
DEPARTMENT OF THE NAVY
DOD-316

